Journal of Pharmaceutical Sciences and Research, 2018, vol.10, N5, pages 1259-1262

Obesity and functional state of kidney depends on VEGF polymorphism

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2018, Pharmainfo Publications. All rights reserved. The aim this study was to investigate the relationship of polymorphism VEGF gene to the functional state of kidneys in patients with various phenotypes of obesity. We examined 240 persons (mean age of 43.4±7.3), which were distributed in several groups. The first group included 90 patients with obesity with metabolic disorders. The second group was presented by 50 patients-they do not display signs of metabolic disorder. The control group was composed of healthy. We detected high levels of VEGF in blood and urine, A2, type IV collagen and predominance of minor C allele in group 1. In group 2, there were VEGF increase in blood and urine (at optimal values of GFR and A1). We detected a link between polymorphism of promoter region of-634 G/C with levels of SBP, GFR, A2, type IV collagen and increased expression of VEGF in blood and urine. The increase in VEGF in the urine reflects the activation of angiogenesis and endothelial dysfunction, aggravated during the development and progression of chronic kidney disease. In the group with obesity and hypertension, we detected an increase of VEGF level in urine, while maintaining the normal range of A and GFR. The distribution of genotypes in the region-634 G/C of VEGF gene revealed the associating carriage of the minor allele in the group 2. In the group 1, albuminuria 2 was associated with the CC variant of VEGF gene (-634 G/C).

Keywords

Gene, Kidney, Metabolic disorder, Obesity, Polymorphism, VEGF

References

[1] Shlyakhto EV, Nedogoda SV, Konradi AO, Baranova EI, Fomin VV, Vertkin AL, Chumakova GA. The concept of novel national guidelines on obesity. Russian J Cardiol 2016; 4:7-13. (In Russian) DOI:10.15829/1560-407--2016-4-7-13.

[2] Bell JA, Kivimaki M, Hamer M. Metabolically healthy obesity and risk of incident type 2 diabetes: a meta-analysis of prospective cohort studies. Obesity 2014; 6: 504-515. DOI:10.1111/obr.12157

[3] Iida M, Yamamoto M, Ishiguro YS, Yamazaki M, Ueda N, Honjo H, Kamiya K. Urinary type IV collagen is related to left ventricular diastolic function and brain natriuretic peptide in hypertensive patients with prediabetes. J Diabetes Complications 2014;28(6): 824-830. DOI: 10.1016/j.jdiacomp. 2014.08.005.

[4] Kajdaniuk D, Marek B, Borgiel-Marek H, Kos-Kudła B. Vascular endothelial growth factor (VEGF) in physiology and pathophysiology. Polish J Endocrinol. 2011; 62(5): 444–455

[5] Thanigaimani S, Kichenadasse G, Mangoni A.A. The emerging role of vascular endothelial growth factor (VEGF) in vascular homeostasis: lessons from recent trials with anti-VEGF drugs. Curr Vasc Pharmacol 2011; 9(3): 358-380.

[6] Loebig M, Klement J, Schmoller A. Evidence for a relationship between vegf and bmi independent of insulin sensitivity by glucose clamp procedure in a homogenous group healthy young men. PLoS One 2010;7:5.

[7] Konenkov VI, Shevchenko AB, Prokofev VF, Klimontov VV, Korolev MA, Fazullina ON. Association of vascular endothelial growth factors (VEGF) gene and cytokines (IL-1B, IL4, IL8, ILIO, TNFA) genes combinations with types 2 diabetes mellitus in women. Diabetes Mellitus 2012; 3: 4-10 (In Russian)

[8] Ghazizadeh H, Fazilati M, Pasdar A, Avan A, Tayefi M, Ghasemi F. Association of a Vascular Endothelial Growth Factor genetic variant with Serum VEGF level in subjects with Metabolic Syndrome. Gene 2016;. 598: 27-31 DOI: org/10.1016/j.gene.2016.10.034.

[9] Mazidi M, Rezaie P, Kengne AP, Stathopoulou MG, Azimi-Nezhad M, Siest S. VEGF, the underlying factor for metabolic syndrome; fact or fiction? Diabet. Metab. Syndr Clin Res.Rev. 2017; 11: 61-64 doi.org/10.1016/j.dsx.2016.12.004.

[10] KDIGO-2017 Clinical Practice Guideline Update for the Diagnosis, Evaluation, Prevention, and Treatment of Chronic Kidney Disease– Mineral and Bone Disorder (CKD-MBD) Kidney International Supplements 2017; 7: 1–59.

[11] Cullberg KB, Olholm J, Paulsen SK, Foldager CB, Lind M, Richelsen B, Pedersen SB. Resveratrol inhibits the hypoxia-induced inflammation and angiogenesis in human adipose tissue in vitro. Eur J Pharm Sci. 2013; 49(2): 251-257. doi: 10.1016/j.ejps.2013.02.014.

[12] Enomoto D, Okura T, Nagao T, Jotoku M, Irita J, Miyoshi K, Higaki J.Relationship between renal hemodynamics and urinary type IV collagen in patients with essential hypertension. Clin Exp Hypertens. 2012; 34(8): 612-616 doi:10.3109/10641963.2012. 683911

[13] Prakash S, Prasad N, Sharma RK, Faridi RM, Agrawal S. Vascular endothelial growth factor gene polymorphisms in North Indian patients with end stage renal disease. Cytokine 2012; 58(2): 261-266. doi: 10.1016/j.cyto.2012.01.020.

[14] Gnudi L, Benedetti S, Woolf AS, Long DA. Vascular growth factors play critical roles in kidney glomeruli. Clin Sci (Lond) 2015; 129(12): 1225-1236. DOI: 10.1042/CS20150403.

[15] Trushin M.V. Light-mediated "conversation" among microorganisms Microbiological Research, 2004; 159(1): 1-10.

[16] Zhang J, Jiang H, Chen J. Combined effect of body mass index and metabolic status on the risk of prevalent and incident chronic kidney disease: a systematic review and meta-analysis Oncotarget 2017; 8(22): 35619-35629. DOI: 10.18632/oncotarget.10915